

CLAIMS

1. A device for the formation of small particles of a certain substance, the device including
- 5 - first inlet means (4) for a solution or a suspension containing the substance,
- second inlet means (3) for an atomizing agent
- mixing means (12) for mixing said solution/suspension and said atomizing agent,
- 10 - outlet means (13) for the particles,
- first conduit means (9, 10) from the first inlet means (4) to the mixing means (12), and
- second conduit means (14, 11) from the second inlet means (3) to the mixing means (12), which first (9, 10) and second (14, 11) conduit means meet
- 15 each other at the mixing means (12) at an angle of at least 30°, preferably at least 45°, and most preferably at least 90°, **characterized in** that the device includes a first part (1) having a first wall (7) and a second part (2) having a second wall (6), the walls forming an interspace between each other, said mixing means (12) being formed by said interspace and in that at least one of said walls (6, 7) is movable
- 20 such that the width of said interspace is adjustable.
2. A device according to claim 1, **characterized in** that said at least one movable wall (7) is movable to and from the other wall (6).
- 25 3 A device accordingly to claim 2, **characterized in** that said movable wall (7) is urged towards the other wall (6) by biasing means.
4. A device according to claim 3, **characterized in** that said biasing means is a mechanical spring.
- 30 5. A device according to anyone of claims 1-4, **characterized in** that said first (4) and second (3) inlet means extend through the first part 1 and the first inlet means (4) and the first conduit means (9, 10) extend through said second part (2).

6. A device according to anyone of claims 1-5, **characterized in** that said interspace constitutes the second conduit means (14, 11), the mixing means (12) and the outlet means (13).
- 5 7. A device according to any of claims 1-6, **characterized in** that the second inlet means (3) includes a straight elongated portion, the centre of which defines the centre axis of the device and in that said second conduit means (14, 11) includes an end section (11) connected to the mixing means (12), the end section forming an angle of at least 30° to the ends of the device, preferably at least 45°
10 and most preferably about 90°.
8. A device according to claim 7, **characterized in** that said end section (11) at least partly is defined by said first and second walls (7, 6).
- 15 9. A device according to claim 8, **characterized in** that said walls (7, 6) are planar walls.
10. A device according to anyone of claims 7-9, **characterized in** that said end section (11) has an angular extension of 360° around said axis.
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11. A device according to any one of claims 7 - 10, **characterized in** that said first conduit means (9, 10) has an end portion (10) connected to said mixing means (12), said end portion (10) extending in a direction of which the main component is axial.
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12. A device according to any one of claims 7 - 11, **characterized in** that the direction of said end section(11) is substantially radial and the direction of said end portion (10) is substantially axial.
- 30 13. A device according to claim 11 or 12, **characterized in** that said end portion (10) is constituted by an elongated slot.

14. A device according to claim 13, **characterized in** that said elongated slot forms a closed loop, preferably a circular loop.
15. A device according to any one of claims 11 - 14, **characterized in** that
5 said end portion (10) terminates in one of said walls (6).
16. A device according to any one of claims 1 - 15, **characterized in** that said outlet means (13) is aligned with said second conduit means (14, 11).
- 10 17. A device according to any one of claims 1 - 16, **characterized in** that the first (4) and second (3) inlet means are coaxial, the second inlet means (3) enclosing the first inlet means (4).
18. A device according to any one of claims 1 - 17, **characterized in** that said
15 second conduit means (14, 11) includes a chamber (14) in which the second inlet means (3) terminates.
19. A device according to anyone of claims 1-18, **characterized in** that said second inlet means (3) is adapted for a gaseous atomizing agent.
- 20 20. A device according to anyone of claims 1-18, **characterized in** that said second inlet means (3) is adapted for a liquid atomizing agent.
21. A device according to any one of claims 1 - 20, **characterized in** that said
25 second inlet means (3) is adapted for an atomizing agent at supercritical stage.
22. A method for the formation of small particles of a certain substance, the method including the steps of
- supplying a jet of an atomizing agent to a mixing area,
 - 30 - supplying a liquid jet of a solution or a suspension containing the substance to the mixing area, and
 - withdrawing a jet of said particles from the mixing area,
- the jet of the atomizing agent and the liquid jet being supplied such that they meet each other in the mixing area at an angle in the range of 30⁰ to 150°, preferably in

the range of 45° to 135°, **characterized in** that said jets are supplied to a mixing area formed by an interspace located between a first wall on a first part of a device and a second wall of a second part of the device and in that the width of said interspace is adjustable.

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23. A method according to claim 22, **characterized in** that the jet of the atomizing agent is a gaseous jet.

24. A method according to claim 22, **characterized in** that the jet of the
10 atomizing agent is a liquid jet.

25. A method according to any one of the claims 21 - 22, **characterized in** that the jet of the atomizing agent is a medium at supercritical state.

15 26. A method according to any one of claims 22 - 25, **characterized in** that said angle is about 90°.

27. A method according to any one of claims 22 - 26, **characterized in** that the jet of the atomizing agent is supplied and the particle jet is withdrawn in such a
20 way that these jets are substantially aligned.

28. A method according to any one of claims 22 - 27, **characterized in** that the atomizing agent is supplied to a cavity from which said gas jet is created.

25 29. A method according to claim 28, **characterized in** that a jet of the atomizing agent of 360° is created.

30. A method according to any one of claims 22 - 29, **characterized in** that the jet of the solution/suspension is created to form an elongated jet.

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31. A method according to claim 30, **characterized in** that the solution/suspension jet is created to form a closed loop, preferably a circular loop.

32. A method according to any one of claims 22 - 31, **characterized in that** the method is performed with the aid of a device according to any one of claims 1 - 21.

5 33. Use of the method according to any one of claims 22 - 32 for forming particles of a size in the range of 0,05 – 10 μm , preferably in the range of 0,05 - 1 μm .

34. Use of the method according to any one of claims 22 - 32 for forming
10 particles of a pharmaceutical substance.

35. Use of the device according to any one of claims 1 - 21 for forming particles of a size in the range of 0,05 – 10 μm , preferably in the range of 0,05 – 1 μm .

15 36. Use of the device according to any of claims 1 - 21 for forming particles of a pharmaceutical substance.

37. Particles obtained by the method according to any one of claims 22 – 32.

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